

What is claimed is;

1. An image signal processing device that processes an image signal constituting a subject image captured by an image-capturing element, comprising:

5 an average calculating unit that calculates pixel output averages for individual colors in each of a plurality of partition areas into which a light-receiving surface of the image-capturing element is divided based upon the image signal;

10 an average ratio calculating unit that calculates a ratio of a pixel output average corresponding to another color to a pixel output average of a reference color for each partition area;

an area extracting unit that extracts an area having
15 a ratio of pixel output averages within a predetermined range;
and

a white balance adjustment unit that performs a white balance adjustment based upon pixel outputs corresponding to the individual colors from the extracted area.

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2. An image signal processing device according to claim 1, wherein:

the white balance adjustment unit includes;

a total sum calculating unit that calculates total sums
25 of pixel output averages corresponding to the individual

colors in the extracted area;

a gain calculating unit that calculates a white balance gain for a color other than the reference color based upon the total sums corresponding to the individual colors; and

5 a pixel output adjustment unit that performs white balance adjustment by multiplying pixel outputs corresponding to the color other than the reference color by the white balance gain.

10 3. An image signal processing device according to claim 1, wherein:

the pixel outputs include a red-color component, a green-color component and a blue color component and the reference color is green.

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4. An image signal processing device according to claim 2, wherein:

the pixel outputs include a red-color component, a green-color component and a blue color component and the
20 reference color is green.

5. An image signal processing device according to claim 1, wherein:

the pixel outputs include a green-color component, a
25 yellow-color component, a cyan-color component and a

magenta-color component and the reference color is green.

6. An image signal processing device according to claim 2, wherein:

5 the pixel outputs include a green-color component, a yellow-color component, a cyan-color component and a magenta-color component and the reference color is green.

7. A digital camera having:

10 an image signal processing device according to claim 1; and

a recording image-capturing element that outputs an image signal used for recording the captured subject image into a recording medium, wherein:

15 an image signal to be used for white balance adjustment is the image signal output by the recording image-capturing element.

8. A digital camera having:

20 an image signal processing device according to claim 1;

a recording image-capturing element that outputs an image signal for recording the captured subject image into a recording medium; and

25 a photometering image-capturing element that outputs

a photometering signal indicating a subject brightness level in each of photometering areas into which a photographic field is divided, wherein:

an image signal to be used for white balance adjustment
5 is the image signal output by the photometering image-capturing element.

9. A computer-readable computer program product having a program to be used to process an image signal constituting
10 a subject image captured at an image-capturing element, with the program comprising:

average calculation processing in which pixel output averages are calculated for individual colors in each of a plurality of partition areas into which a light-receiving
15 surface of the image-capturing element is divided based upon the image signal;

average ratio calculation processing in which a ratio of the pixel output average corresponding to another color to the pixel output average corresponding to a reference color
20 is calculated for each partition area;

area extraction processing in which any area having a ratio of pixel output averages within a predetermined range is extracted from the plurality of partition areas; and

white balance adjustment processing in which white
25 balance adjustment is performed based upon pixel outputs

corresponding to the individual colors from the extracted area.

10. A computer program product according to claim 9, with
5 the program further comprising:

total sum calculation processing in which total sums of the pixel output averages corresponding to the individual colors in the extracted area are calculated;

gain calculation processing in which a white balance
10 gain for a color other than the reference color is calculated based upon the total sums corresponding to the individual colors; and

pixel output adjustment processing in which a white balance adjustment is performed by multiplying pixel outputs
15 corresponding to the color other than the reference color by the white balance gain.

11. A computer program product according to claim 9,
constituted as a recording medium having recorded therein the
20 program.

12. A computer program product according to claim 9,
constituted as a carrier wave having the program embodied as
a data signal thereupon.

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13. An image signal processing device according to claim 9, wherein:

the pixel outputs include a red-color component, a green-color component and a blue color component and the reference color is green.

14. A computer program product according to claim 10, wherein:

the pixel outputs include a red-color component, a green-color component and a blue color component and the reference color is green.

15. A computer program product according to claim 9, wherein:

the pixel outputs include a green-color component, a yellow-color component, a cyan-color component and a magenta-color component and the reference color is green.

16. A computer program product according to claim 10, wherein:

the pixel outputs include a green-color component, a yellow-color component, a cyan-color component and a magenta-color component and the reference color is green.

17. A computer program product according to claim 9,

wherein:

an image signal to be utilized in white balance adjustment is an image signal used for recording the captured subject image into a recording medium.

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18. A computer program product according to claim 10, wherein:

an image signal to be utilized in white balance adjustment is a photometering signal indicating subject
10 brightness levels each corresponding to one of a plurality of photometering areas into which a photographic field is divided.

19. An image signal processing device that processes an
15 image signal constituting a subject image captured by an image-capturing element comprising:

a saturation calculating unit that calculates a saturation level in each of a plurality of partition areas based upon pixel outputs from the partition areas into which
20 a light-receiving surface of the image-capturing element is divided;

an area extracting unit that extracts any area having a saturation level within a predetermined range from the plurality of partition areas; and

25 a white balance adjustment unit that performs a white

balance adjustment based upon pixel outputs corresponding to individual colors from the extracted area.

20. A digital camera having:

5 an image signal processing device according to claim 19; and

a recording image-capturing element that outputs an image signal used for recording the captured subject image into a recording medium, wherein:

10 an image signal to be used for white balance adjustment is the image signal output by the recording image-capturing element.

21. A digital camera having:

15 an image signal processing device according to claim 19;

a recording image-capturing element that outputs an image signal for recording the captured subject image into a recording medium; and

20 a photometering image-capturing element that outputs a photometering signal indicating a subject brightness level in each of photometering areas into which a photographic field is divided, wherein:

an image signal to be used for white balance adjustment
25 is the image signal output by the photometering image-

signal;

an average ratio calculating unit that calculates a ratio of the pixel output average corresponding to another color to the pixel output average of a reference color for
5 each partition area;

a hue detecting unit that detects a hue of each partition area based upon the ratio of the pixel output averages;

an area extraction unit that extracts any partition area with a hue manifesting a frequency equal to or lower than a
10 predetermined frequency value from the plurality of partition areas based upon a hue frequency distribution among the plurality of partition areas; and

a white balance adjustment unit that performs white balance adjustment based upon pixel outputs corresponding to
15 individual colors from the extracted area.

24. An image signal processing device according to claim 23, wherein:

the white balance adjustment unit further includes;
20 a total sum calculating unit that calculates total sums of pixel output averages corresponding to the individual colors in the extracted area;

a gain calculating unit that calculates a white balance gain for a color other than the reference color based upon
25 the total sums corresponding to the individual colors; and

a pixel output adjustment unit that performs white balance adjustment by multiplying pixel outputs corresponding to the color other than the reference color by the white balance gain.

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25. An image signal processing device according to claim 23, wherein:

the pixel outputs include a red-color component, a green-color component and a blue color component and the reference color is green.

26. An image signal processing device according to claim 24, wherein:

the pixel outputs include a red-color component, a green-color component and a blue color component and the reference color is green.

27. An image signal processing device according to claim 23, wherein:

the pixel outputs include a green-color component, a yellow-color component, a cyan-color component and a magenta-color component and the reference color is green.

28. An image signal processing device according to claim 24, wherein:

the pixel outputs include a green-color component, a yellow-color component, a cyan-color component and a magenta-color component and the reference color is green.

5 29. A digital camera having:

an image signal processing device according to claim 23; and

10 a recording image-capturing element that outputs an image signal used for recording the captured subject image into a recording medium, wherein:

an image signal to be used for white balance adjustment is the image signal output by the recording image-capturing element.

15 30. A digital camera having:

an image signal processing device according to claim 23;

20 a recording image-capturing element that outputs an image signal for recording the captured subject image into a recording medium; and

a photometering image-capturing element that outputs a photometering signal indicating a subject brightness level in each of photometering areas into which a photographic field is divided, wherein:

25 an image signal to be used for white balance adjustment

is the image signal output by the photometering image-capturing element.

31. A computer-readable computer program product having a
5 program to be used to process an image signal constituting
a subject image captured at an image-capturing element, with
the program comprising:

average value calculation processing in which pixel
output averages for individual colors in each of a plurality
10 of partition areas into which a light-receiving surface of
the image-capturing element is divided based upon the image
signal;

average ratio calculation processing in which a ratio
of the pixel output average corresponding to another color
15 to the pixel output average corresponding to a reference color
is calculated for each partition area;

hue detection processing in which a hue of each
partition area is detected based upon the ratio of the pixel
output averages;

20 area extraction processing in which any partition area
with a hue manifesting a frequency equal to or lower than a
predetermined frequency value is extracted from the plurality
of partition areas based upon a hue frequency distribution
among the plurality of partition areas; and

25 white balance adjustment processing in which a white

balance adjustment is performed based upon pixel outputs corresponding to individual colors from the extracted area.

32. A computer-readable computer program product according to claim 31 with the program further comprising:

total sum calculation processing in which total sums of the pixel output averages corresponding to the individual colors in the extracted area are calculated;

gain calculation processing in which a white balance gain for a color other than the reference color is calculated based upon the total sums corresponding to the individual colors; and

pixel output adjustment processing in which a white balance adjustment is performed by multiplying pixel outputs corresponding to the color other than the reference color by the white balance gain.

33. A computer program product according to claim 31, constituted as a recording medium having recorded therein the program.

34. A computer program product according to claim 31, constituted as a carrier wave having the program embodied as a data signal thereupon.

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wherein:

an image signal to be utilized in white balance adjustment is an image signal used for recording the captured subject image into a recording medium.

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40. A computer program product according to claim 31, wherein:

an image signal to be utilized in white balance adjustment is a photometering signal indicating subject
10 brightness levels each corresponding to one of a plurality of photometering areas into which a photographic field is divided.

41. An image signal processing device that processes an
15 image signal constituting a subject image captured at an image-capturing, comprising:

a hue calculating unit that calculates a hue of each of a plurality of partition areas based upon pixel outputs from the partition areas into which a light-receiving surface
20 of the image-capturing element is divided;

an area extracting unit that extracts any area having a hue manifesting a frequency equal to or lower than a predetermined frequency value from the plurality of partition areas based upon a hue frequency distribution among the
25 plurality of partition areas; and

a white balance adjustment unit that performs a white balance adjustment based upon pixel outputs corresponding to the individual colors from the extracted area.

5 42. A digital camera having:

an image signal processing device according to claim 41; and

10 a recording image-capturing element that outputs an image signal for recording the captured subject image into a recording medium, wherein:

an image signal to be used for white balance adjustment is the image signal output by the recording image-capturing element.

15 43. A digital camera having:

an image signal processing device according to claim 41;

20 a recording image-capturing element that outputs an image signal for recording the captured subject image into a recording medium; and

a photometering image-capturing element that outputs a photometering signal indicating a subject brightness level in each of photometering areas into which a photographic field is divided, wherein:

25 an image signal to be used for white balance adjustment

is the image signal output by the photometering image-capturing element.

44. A computer-readable computer program product having a
5 program to be used to process an image signal constituting
a subject image captured at an image-capturing element, with
the program comprising:

hue calculation processing in which a hue of each of
a plurality of partition areas is calculated based upon pixel
10 outputs from the partition areas into which a light-receiving
surface of the image-capturing element is divided;

area extraction processing in which any area
manifesting a frequency equal to or lower than a predetermined
frequency value is extracted from the plurality of partition
15 areas based upon a hue frequency distribution among the
plurality of partition areas; and

white balance adjustment processing in which white
balance adjustment is performed based upon pixel outputs
corresponding to individual colors from the extracted area.